

REMARKS**Drawing Objections**

In the present Office Action, the Examiner objected to Figure 17. A revised Figure 17 is submitted with this response that overcomes the drawing objections. The revised figure shows reference signs 170 and 176 (mentioned in the specification and not present in the figure), and deletes reference sign 180 (present in the figure and not present in the specification).

The drawings were further objected to for failing to show an electromagnetic absorber, electromagnetic reflector, or antenna, in relation to claims 14 – 16.

New Figures 20A – 20C are added to illustrate conventional versions of these devices. This figure is added to the background section, and labeled Prior Art, and no new material is added. Support for the description of the conventional absorber is found at Application, page 2, lines 1 – 6. The claimed devices of the dependent claims at issue include an inventive FSS according to the relevant independent claim. Replacement drawing sheets are enclosed herewith for Figures 16, 17, 20A, 20B and 20C.

Claim Objections

Claim 22 is objected to because of the term "each unit cell." This claim is amended to overcome this rejection. Claim 17 was amended to include language from claim 22, using the appropriate term.

Claim Rejections – 35 USC §112

Claims 7, 21, and 39 – 40 are rejected under 35 USC 112 as being indefinite.

Claim 7 is amended to depend from claim 6, giving antecedent basis for "the conducting polymer".

Claim 21 is amended to depend from claim 20, giving antecedent basis for "the remote source of electromagnetic radiation."

Claims 39 and 40 are both cancelled.

Claim Rejections – 35 USC §102

Claims 1 – 4, 6 – 29, and 32 – 44 are rejected as anticipated by Werner et al., US2004/0263420 (hereinafter "Werner").

Regarding claims 1 – 3, and 6 – 16, claim 1 is amended to describe the unit cell comprising a dielectric substrate, at least one conducting patch on the dielectric substrate, and a chemoresistive switch comprising the chemoresistive material adjacent the conducting patch, the chemoresistive switch having a switch state related to the presence or absence of the analyte, the FSS having an electromagnetic property that is modified by a change in the switch state so as to allow detection of the analyte.

This amendment is supported, for example, by: original claims 2 – 3, 27; page 5, lines 20 – 33; page 9, lines 18 – 28; page 28 lines 8 – 11.

These aspects are not disclosed by Werner. Werner discloses switches between conducting patches, but does not disclose chemoresistive switches. The rejection refers to Werner paragraph 56, which discloses possible materials for the conducting patches, but does not suggest chemoresistive materials for use in a chemoresistive switch. The listing of possible materials in Werner paragraph 56 relates to the conducting patches, and does not suggest materials for chemoresistive switch configurations.

Further regarding claim 2, this claim is amended to refer to at least two conducting patches interconnected by the chemoresistive switch comprising the chemoresistive material. Support for this amendment is found, for example, at page 3, lines 3 – 5.

Further regarding claim 3, this claim is amended to refer to at least two conducting metal patches interconnected by the chemoresistive switch comprising the chemoresistive material. There is no suggestion in Werner that the patches could be metal patches interconnected by a chemoresistive material. Support for this amendment is found, for example, at page 11, lines 7 – 10.

Claim 4 is cancelled.

Hence, claims 1 – 3, and 6 – 16 are allowable over the cited reference.

Regarding claims 17 – 24, these claims relate a process for detection of an analyte. Claim 17 is amended to refer to providing an apparatus including a frequency selective surface (FSS), the FSS comprising a periodically replicated unit cell, the unit cell comprising a dielectric substrate and

a chemoresistive material. Support for this amendment is found, for example, in original claim 22, and page 5 lines 3 – 8.

Regarding claims 17 – 24, Werner does not disclose detection of analytes using an FSS. In the rejection of the apparatus claim 1, the Examiner cites Werner paragraph 56 for disclosing materials useful for conducting patches, such as a conducting polymer. However, the possibility that a conducting polymer may be chemoresistive is not suggested by Werner paragraph 56.

Further regarding claims 21 and 24, the combination of references fails to suggest using a radar beam to detect analytes using the electromagnetic properties of an FSS.

Further regarding claim 22, this claim is amended to refer to the FSS being an arrangement of metal patches selectively electrically interconnectable by chemoresistive switches, the chemoresistive switches including the chemoresistive material. Support for this amendment is found, for example, in Figure 3 and associated description. This arrangement is not found in the cited reference.

Hence, claims 17 – 24 are allowable over the cited reference.

Regarding claims 25 – 29, claim 25 is amended to refer to the FSS comprising a dielectric substrate; an arrangement of conducting metal patches on the dielectric substrate; and at least one chemoresistive element comprising the chemoresistive material interconnecting a pair of conducting metal patches. Support for this amendment is found, for example, at page 10. lines 7 – 19.

Werner discloses that patches may be formed from various conducting materials (Werner, paragraph 56). However, Werner does not disclose forming the conducting patches from metal, then interconnecting a pair of conducting metal patches using a chemoresistive element comprising a chemoresistive material.

Further regarding claim 29, there is no suggestion in Werner to use a plurality of chemoresistive materials. For example, there is no suggestion to use a chemoresistive material in a MEMS switch (Werner paragraph 53, cited in the Office Action), as the MEMS switch is a mechanical switch operated by an electrical signal. The listing of alternative conducting materials does not suggest using a plurality of chemoresistive materials so as to detect more than one analyte.

Hence, claims 25 – 29 are allowable over the cited reference.

Regarding claims 32 – 35, claim 32 is amended to relate to an apparatus comprising a periodic structure including a pattern of metal patches and a pattern of chemoresistive material. Claim 32 is also amended to refer to an FSS. Support for this amendment is found, for example, at page 10, lines 7 – 19, and original claims 33 – 34.

Werner suggests a number of conducting materials that could be used to form the conducting patches, but does not describe a FSS formed from a pattern of metal patches and a pattern of chemoresistive materials.

Further regarding claim 34, this claim is amended to refer to the conducting metal patches being selectively interconnected by the chemoresistive material. Support for this amendment is found, for example, at page 10, lines 7 – 19.

Hence, claims 32 – 35 are allowable over the cited reference.

Regarding claims 36 – 42, claim 36 is amended to describe an apparatus including a frequency selective surface (FSS), the FSS comprising a pattern of conductive patches, the conducting patches being selectively interconnectable by a matrix of independently addressable switches, wherein the switches are passive switches not in electrical communication with a voltage source, the switches being responsive to an analyte, the switches having a first electrical conductivity in a presence of the analyte, and a second electrical conductivity in an absence of the analyte. Support for this amendment is found, for example, in original claims 37, 38, and 39.

This configuration is not disclosed in Werner. In particular, Werner does not disclose switches having a first electrical conductivity in a presence of the analyte, and a second electrical conductivity in an absence of the analyte.

Further regarding claim 42, the cited reference fails to suggest the use of a plurality of switch types, each responsive to a different analyte.

Claims 37 – 41 are cancelled.

Hence, claims 36 and 42 are allowable over Werner.

Hence, claims 1 – 3, 6 – 29, 32 – 36, and 42 allowable over Werner et al., US2004/0263420 (referred to herein as "Werner"). Claims 4, 37 – 41, and 43 – 44 are cancelled.

Claim Rejections – 35 USC §103(a)

Claims 5 and 30 – 31 are rejected over the combination of Werner and Eggleston et al. (6,054,954), hereinafter "Eggleston."

Regarding claim 5, this claim is amended to be in independent form. Support for the amendment of claim 5 is found in original claim 1.

Eggleston discloses a dielectric slot in a metal sheet. However, nothing in the combination of references suggests inclusion of a chemoresistive material adjacent to the dielectric slot.

Regarding claims 30 and 31, claim 30 is amended to be in independent form. Support for this amendment is found, for example, in original claim 25.

Eggleston discloses a dielectric slot in a metal sheet. However, nothing in the combination of references suggests inclusion of a chemoresistive material within a metal screen (claim 30), for example adjacent to the dielectric slot (claim 31).


Hence, claims 5 and 30 – 31 are allowable over the combination of Werner and Eggleston.

Examples of support for amendments are exemplary, and there may be other examples not described. Page and line numbers relate to PCT/US2005/001295.

In view of the above amendment, Applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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